

Activity #2: Solar System Collisions

Please go to the web site: <http://janus.astro.umd.edu/astro/impact/>

You will use Table 2 to compare the damage done and the energy released by projectiles that have the same diameter, but are made of different material. Compositions and densities are different. Define “density” before you begin Table 2. Density means

**Table 2**

**Body hits Earth at velocity = 20 km/sec**

**Projectile diameter =100m**

<b>Composition</b>	<b>Results: what happens? Where?</b>	<b>Energy released</b>	<b>Crater diameter</b>	<b>Crater depth</b>	<b>Frequency once every...</b>
Rock					
Ice					
Iron					

**Body hits Earth at velocity = 20 km/sec**

**Projectile diameter = 1 km**

<b>Composition</b>	<b>Results: what happens? Where?</b>	<b>Energy released</b>	<b>Crater diameter</b>	<b>Crater depth</b>	<b>Frequency once every...</b>
Rock					
Ice					
Iron					

2-1. In Table 2, the size (diameter) of the projectile was kept constant. By what factor approximately did the energy change as the projectile changed from ice to rock?  
ice to iron?  
rock to iron?

Write the kinetic energy formula. (Do a Search if you forgot it.)  
Which variable changed?  
Does this make sense? Explain.

2-2. Using Table 2 compare collision frequencies for the same projectile size, but different compositions. Rank from most frequent to rarest.  
What is the general trend in frequency?

How do you explain these differences?

2-3. a) What is the density of water?

b) By what factor does the energy change when the composition changes from ice to rock?

c) Estimate the density of rock. (Think in terms of the factors that appear in the energy equation, what changes and what is kept constant.)

d) Estimate the density of iron.

2-4. Would it be worse if the Earth were hit by a comet or an asteroid? (Assume they have equal diameters.) Explain your answer.